

# PNNL captures bird's-eye view of Puget Sound pollution

Dawn White, PNNL

Launching what will be the first sky-based study of Puget Sound's air quality, scientists from the Department of Energy's Pacific Northwest National Laboratory, are flying Seattle's periodically hazy skies this month in search of answers about regional ozone and other pollutants.

The study, called Pacific Northwest 2001, is designed to gather first-of-its-kind air chemistry data essential to effectively address regional air quality problems such as ozone and microscopic atmospheric particles, called particulates. Levels of ozone in the greater Seattle area periodically exceed regulatory limits. Particulates, which aggravate asthma sufferers and have been linked to other serious health problems and air-pollution-related deaths, are nearing peak recommended levels.

"Despite increased concern about air pollution in our region, no one has captured the atmospheric data needed to understand how pollutants form, travel and interact within the Puget Sound area," said Leonard Barrie, PNNL chief atmospheric scientist and co-coordinator for the study. "We expect this study to fill that information gap and hopefully lead to improvements in models used to forecast pollution levels."



**Sophisticated analytical equipment for measuring atmospheric phenomena is located inside the Grumman Gulfstream-1 aircraft operated by PNNL as a DOE research aircraft.**

## Multi-agency effort

PNNL formed and is leading the multi-organization study, which is being coordinated with the Environmental Protection Agency's Region 10 Office and includes collaborators at Washington State University, the University of Washington, the Puget Sound Clean Air Agency, the Washington state Department of Ecology and Environment Canada.

PNNL is conducting research flights in a Gulfstream-1 research aircraft between Seattle and Bellingham, tracking the flow of pollutants within the greater Puget Sound basin. Scientists hope to gain a better understanding of the distribution, transport and formation of ozone, particulates and the chemicals that form these pollutants in the atmosphere. Of particular interest is the fate of Seattle pollution as it is trapped in the foothills of Mt. Rainier and the Cascade Mountain Range. Scientists also hope to better document contributions made to ozone formation by forested areas along the Cascades.

"The Puget Sound area has a wide range of natural and manmade sources of pollution that contribute to ozone and particle formation and whose emissions we can sample with our aircraft," said Richard Barchet of PNNL, another of the study co-coordinators.

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## **PNNL captures bird's-eye view of Puget Sound pollution, cont.**

### **Above-ground data**

The atmospheric measurements will enable the first comprehensive testing of regional air quality forecast models with above-ground data. Current evaluations of regional air quality models are based solely on data gathered at ground level. Data from PNW-2001 is expected to greatly enhance the models' capabilities, leading to more accurate predictions for people who rely on them for health and recreational purposes. Also, data from the study eventually may be used to broaden the scope of certain models to include particulates such as those from diesel exhaust, which are of keen interest to people suffering from respiratory problems.

PNNL scientists chose late summer for the study to capture the region's peak pollution period, during which stagnant conditions with an inversion aloft and weak northwesterly winds trap pollution against the Cascades. Also, ozone levels peak in summer months due to the increased sunlight and high temperatures needed for its formation.

### **Linking with B.C.**

The study's timing also enables the team to coordinate with a simultaneous Canadian air quality study called, Pacific 2001, of particulates and ozone in the Vancouver, B.C., area. In addition, PNNL is working with regional universities and government agencies to coordinate aircraft measurements with other regional air quality measurement and modeling activities.

Data from PNW-2001 and Pacific 2001 will be combined, resulting in the first comprehensive regional air quality and meteorological database for use in improving predictive air quality models used by regulatory agencies. While preliminary results will be available in a few months, full analysis will take place in 2002.

PNW-2001 is funded by DOE and EPA under the auspices of the North American Research Strategy for Tropospheric Ozone, or NARSTO. For more information, see the PNW-2001 Web site at: <http://www.pnl.gov/pnw2001/>. ♦